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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,561	02/13/2002	Bryan Franz Dufner	C-2199Re	3207

7590 06/07/2006  
M P Williams  
210 Main Street  
Manchester, CT 06040

EXAMINER

ZHENG, LOIS L

ART UNIT PAPER NUMBER

1742

DATE MAILED: 06/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/075,561	DUFNER ET AL.	
	Examiner	Art Unit	
	Lois Zheng	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 17-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 17-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Status of Claims*

1. Claims 1-14 and 17-19 are currently under examination.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 6-10 and 13-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Taniguchi et al. US 6,083,638(Taniguchi).

The teachings of Taniguchi are discussed in paragraph 4 of the previous Non-Final Office Action mailed 6 January 2006. The rejection grounds of the instant claims 1-3, 6-10 and 13-14 are maintained for the same reasons as stated in paragraph 4 of the previous Non-Final Office Action.

### *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3-7, 10-12 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. US 6,083,638(Taniguchi) in view of Lindstrom US 4,647,359(Lindstrom).

The teachings of Taniguchi are discussed in paragraphs 4 and 6 of the previous Non-Final Office Action mailed 6 January 2006. However, Taniguchi does not teach the claimed high structure carbon black as recited in claims 3 and 10.

Lindstrom discloses a gas diffusion electrode comprising a diffusion layer of Vulcan XC-72 mixed with hydrophobic binder such as TEFLON®(col. 2 lines 29-40).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the diffusion layer of Lindstrom into the hydrophobic phase of Taniguchi in order to improve contact with the electrode and enables resistance to flexure of the electrode under the forces of gas or liquid flow in the electrochemical cell as taught by Lindstrom(col. 3 lines 27-36).

Regarding claims 3 and 10, Vulcan XC-72 used with hydrophobic binder as taught by Taniguchi reads on the claimed high structure carbon black. The additional claim limitations are rejected for the same reasons as stated in paragraphs 4 and 6 of the previous Non-Final Office Action.

Regarding claims 4-7, 11-12 and 19, the instant claims are rejected for the same reasons as stated in paragraph 4 and 6 of the previous Non-Final Office Action.

6. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi, and in view of Fuglevand et al. US 6,030,718(Fuglevand).

The teachings of Taniguchi are discussed in paragraphs 4 and 6 of the previous Non-Final Office Action. However, Taniguchi does not explicitly teach that partially hydrophobic bi-layer disposed between the hydrophilic substrate layer and the membrane electrode assembly as claimed.

Fuglevand teaches proton exchange membrane fuel cell comprising a membrane electrode assembly(Fig. 26, #161,162,151) and two diffusion layers(Fig. 26, #171,172), wherein the first diffusion layer interfaces with the electrodes and has a hydrophobic gradient(col. 9 lines 57-58). Fuglevand further teaches that the diffusion layer is a composition coating comprising layers of multiple coats of different hydrophobicity(col. 57-65). Each layer comprises a combination of hydrophobic and hydrophilic resins(col. 10 lines 62-67). The layer closest to the second diffusion layer may be the least hydrophobic.

Therefore, one of ordinary skill in the art would have found it obvious to have incorporated the first diffusion layer as taught by Fuglevand into the two-phase porous support plates of Taniguchi in order to facilitates the retention of sufficient moisture to achieve substantially the maximum current density possible without the addition of extra moisture or humidification as taught by Fuglevand(col. 11 lines 32-40).

Regarding claim 17, since the diffusion layer as taught by Taniguchi in view of Fuglevand contains several layers of material at different hydrophobicity, the examiner concludes that the first coat of the diffusion layer with higher hydrophobicity reads on the claimed partially hydrophobic bi-layer, and the second coat of the diffusion layer with lower hydrophobicity reads on the hydrophilic substrate based on the broadest

reasonable interpretation. Therefore, the instantly claimed apparatus does not distinguish from the apparatus of Taniguchi in view of Fuglevand.

Regarding claim 18, the instant claim is rejected for the same reasons as stated in the rejection of instant claims 4-5 and 11-12 above.

### ***Response to Arguments***

7. Applicant's arguments filed 23 March 2006 have been fully considered but they are not persuasive.

That Taniguchi has only one porous layer. The examiner does not find applicant's argument persuasive. Since Taniguishi teaches that the hydrophilic and hydrophobic phases are applied to the porous support plates(col. 12 lines 36-37), and the structure of the contact bi-layer is not clearly defined in the specification, the examiner maintains the position that Taniguishi teaches the claimed contact-bi-layer and the claimed porous support substrate.

Regarding applicant's argument that Taniguishi does not teach the claimed low structure carbon black, the examiner does not find it persuasive since Taniguishi teaches using carbon black with NAFLON® in the hydrophilic phase. Therefore, the carbon black of Taniguishi is inherently low structure carbon black as claimed.

Regarding applicant's arguments of a porous water transport plate, the examiner does not find applicant's argument persuasive since the instant claims do not require that the water transport plate is porous.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LLZ

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